

## **REMARKS**

Claims 14 and 20 are rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. In response thereto, Applicants have amended the claims to address the issues raised by the Examiner. Accordingly, all of the claims are now deemed to be in compliance with 35 USC §112.

Claims 1-2, 5-8, 11-14, 17-20, 23-26, 28, 30-31, 33, 35-36, 38, 40-41, and 43 are rejected under 35 USC §103 as being unpatentable over Eggleton et al., U.S. 6,201,916.

Independent claim 1 recites a gap-soliton structure. The gap-soliton structure includes a cladding structure having alternating layers of different index values. A core region is interposed between the alternating layers of index values and comprises a modified core portion in which propagation of certain frequencies is not allowed and includes one or more non-linear materials. The core and the cladding structure are arranged so as to achieve gap-soliton bistability.

Independent claim 7 recites a method of forming a gap-soliton structure. The method includes forming a cladding structure having alternating layers of different index values. Also, the method includes forming a core region that is interposed between the alternating layers of index values and comprises a modified core portion in which propagation of certain frequencies is not allowed and includes one or more non-linear materials. Furthermore, the method includes arranging the core and the cladding structure so as to achieve gap-soliton bistability.

Independent claim 13 recites a gap-soliton structure. The gap-soliton structure includes a cladding structure having alternating layers of different index values. A core region is interposed between the alternating layers of index values and comprises a modified core portion in which propagation of certain frequencies is not allowed and includes one or more non-linear materials.

Either the core or the cladding structure is indicative to enhancing the gap-soliton bistability of the structure.

Independent claim 19 recites a method of forming a gap-soliton structure. The method includes forming a cladding structure having alternating layers of different index values. Also, the method includes forming a core region that is interposed between the alternating layers of index values and comprises a modified core portion in which propagation of certain frequencies is not allowed and includes one or more non-linear materials so that either the core or the cladding structure is indicative to enhancing the gap-soliton bistability of the structure.

Eggleton et al. '916 describes a pulse reshaper that can transform a distorted input light pulse into a reshaped output light pulse. The pulse reshaper is an all-optical pulse reshaper that comprises an optical waveguide having an effective length, the waveguide connecting the input and the output and comprising optical non-linear material, with a periodic variation of an effective refractive index of the optical waveguide. The optically non-linear material and the periodic variation are selected such that the reshaped output light pulse is a substantially transform-limited output light pulse.

However, claims 1, 7, 13, and 19 recite a modified core portion in which propagation is not allowed and includes one or more non-linear materials. Eggleton et al. '916 describes using a periodically poled planar  $\text{LiNbO}_3$  (or other material with large nonlinearity) waveguide with periodically varying effective refractive index. FIG. 8 of Eggleton et al. '916 schematically depicts such a waveguide, wherein numeral 81 refers to a  $\text{LiNbO}_3$  body, numeral 82 refers to the proton-exchanged core of the waveguide, and numeral 83 refers to a patterned layer of an optically substantially linear material, e.g., silicon nitride, that provides a periodically varying effective refractive index. Note Eggleton et al. '916 does not describe forming a modified core

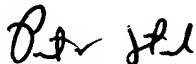
region as recited in the independent claims. Moreover, Eggleton et al. '916 does not even contemplate this concept of having with a core with a modified core prohibiting propagation of certain frequencies. The core 83 of Eggleton et al. '916 is described as being a proton-exchanged core, which clearly stipulates that it does not have a modified core for prohibiting propagation of certain frequencies. Therefore, Eggleton et al. '916 does not render obvious claims 1, 7, 13, and 19.

As to claims 2, 5-6, 8, 11-12, 14, 17-18, 20, 23-26, 28, 30-31, 33, 35-36, 38, 40-41, and 43, they are dependent on claims 1, 7, 13, and 19, respectively. Therefore, claims 42, 5-6, 8, 11-12, 14, 17-18, 20, 23-26, 28, 30-31, 33, 35-36, 38, 40-41, and 43 are also allowable for the same reasons argued with respect to claim 1, 7, 13, and 19.

In view of the above amendments and for all the reasons set forth above, the Examiner is respectfully requested to reconsider and withdraw the rejections made under 35 U.S.C. §§§ 103 and 112, second paragraph. Accordingly, an early indication of allowability is earnestly solicited.

If the Examiner has any questions regarding matters pending in this application, please feel free to contact the undersigned below.

Respectfully submitted,

 Reg. No. 42,298  
Matthew E. Connors  
Registration No. 33,298  
Gauthier & Connors LLP  
225 Franklin Street, Suite 2300  
Boston, Massachusetts 02110  
Telephone: (617) 426-9180  
Extension: 112